



Maui County Water Use and Development Plan Update

*Board of Water Supply
Briefing*

September 21, 2017
Maui County Department of Water Supply

OLA NĀ MEA A PAU I KA WAI
By Water All Things Find Life

Presentation Outline

- BWS process for WUDP update
- Part I: Introduction and Technical Approach - *Recap*
- Part II: Water Resource Management, Strategies and Recommendations
- What's Next: Part III: Regional Plans

Board of Water Supply WUDP Process

Part I: Technical Approach
(Regulatory Framework, Issues
& Concerns, Planning
Objectives, Existing and Future
Water Use)

Part II: Island Wide Strategies
and Policies that support
planning objectives and reflect
guiding principles

Part III: Refined regional
strategies for source
development



MAUI ISLAND WATER USE & DEVELOPMENT PLAN DRAFT

1. DWS transmits proposed updates to BWS and CWRM for review.
2. BWS to hold one or more public hearings, transmit the proposed update with its findings and recommendations to the department within 180 days
3. The department to review BWS recommendations and if deemed necessary, make revisions. Transmit to County Council within 60 days of receipt of BWS recommendations
4. County Council to pass the proposed update by ordinance within 180 days (may extend by resolution)
5. County Clerk to transmit the ordinance to the CWRM for final review, acceptance, and incorporation into the Hawaii Water Plan.

Part I RECAP: WUDP in a nutshell

Guide and advise the Maui County Council and the state CWRM in planning, management, water development and use and allocation of the island's water resources

(State Water Code HRS§174C-31 and Maui County Code Chapter 14.02)

- Set forth the allocation of water to land use through the development of policies and strategies to guide the County in its planning, management, and development of water resources to meet projected demands over 20 year planning period

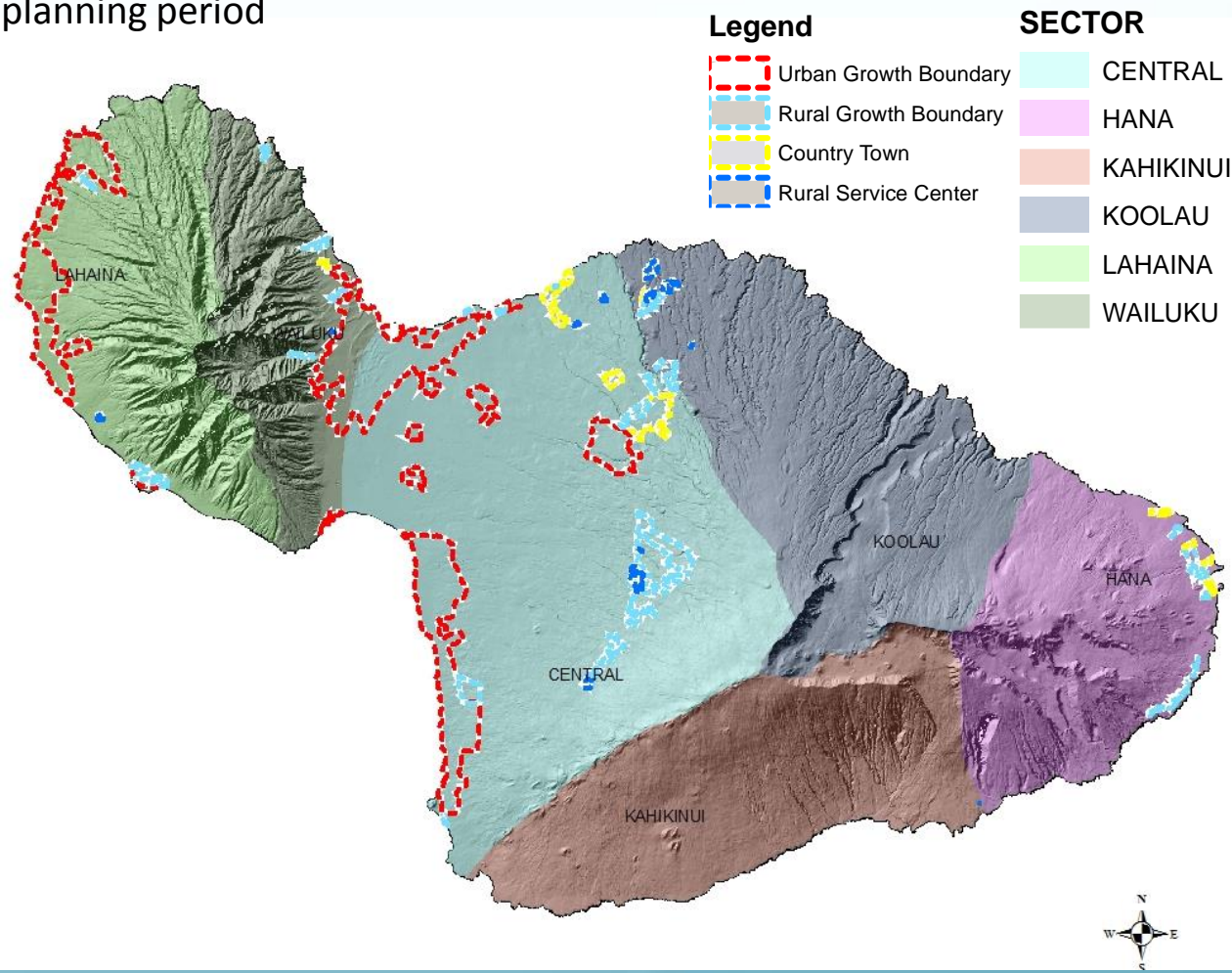
- Based on hydrologic units: 6 Aquifer Sector Areas

- Consistent with Maui General Plan; Community Plans; and other Policy Plans including DHHL

- Strategic water resource plan to inform and guide the DWS capital improvement program

- CIP program identifies site specific improvements and costs

- Applies to all water users and uses



Part I RECAP

Management Framework

- **Issues and Concerns:** Impacts of water transport from wet regions on the ecosystem and public trust and other local uses; impact on water resources from population growth and climatic changes
- **Planning Objectives**
 - Sustainability
 - Water Resources
- **Values and Principles**
 - Streams
 - Environment
 - Equity
 - DHHL
 - Agriculture
 - Cultural Resources
 - Availability
 - Quality
 - Reliability
 - Efficiency
 - Cost
 - Equity
 - Conformity
 - Viability

Planning Scenarios

- Population Based Water Demand vs Land Use Full Build Out Scenario
- Drought and Climate Change
- Agricultural Water Demand

Water Resource Availability

- **Groundwater:** sustainable yield, drought conditions, designated management areas, water quality, development cost and risk
- **Surface water:** Uncertainty, instream flow standards, lack of gages and legal issues
- **Alternative Water Resources:** Recycled wastewater, rainwater catchment, stormwater reuse, desal

Part I RECAP

Resource	Available	Used	Balance
Groundwater	427	91	336
Potable Uses		29	
Nonpotable Uses		62	
Surface Water		362	
Potable Uses		11	
Nonpotable Uses		351	
Recycled water	26	3	23

Water Resource Use

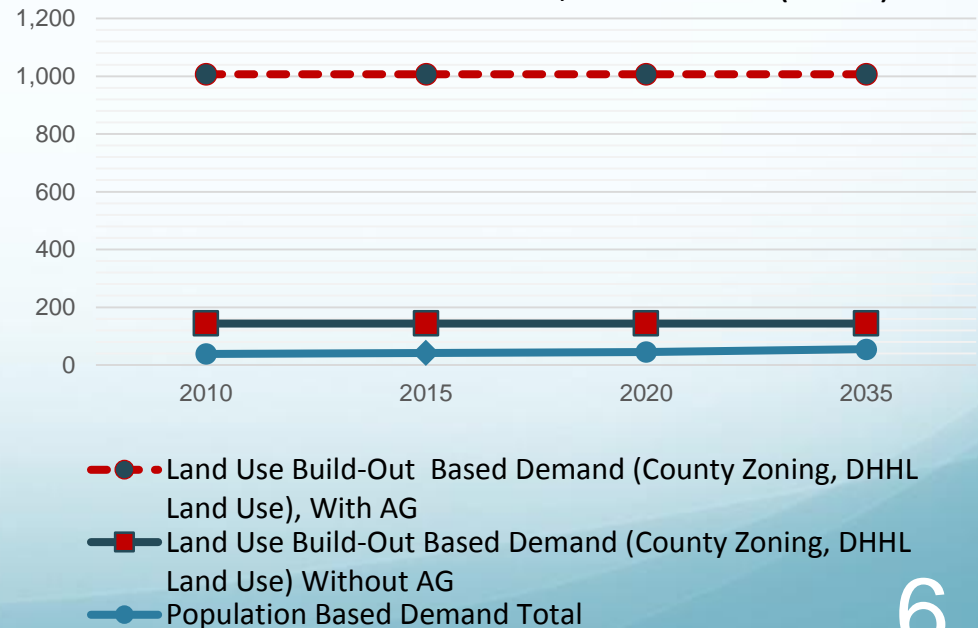
Water Use Unit Rates:

system standards vs actual water use,
projected ag crops

Projected Demand:

- **Population growth:** low, mid and high growth cases
- **Ag demand:** Kuleana/Lo'i Kalo, Diversified ag, HC&S lands
- Dept of Hawaiian Homelands

Maui Island Population Growth and Land Use Build-Out Based Demand, 2010-2035 (MGD)



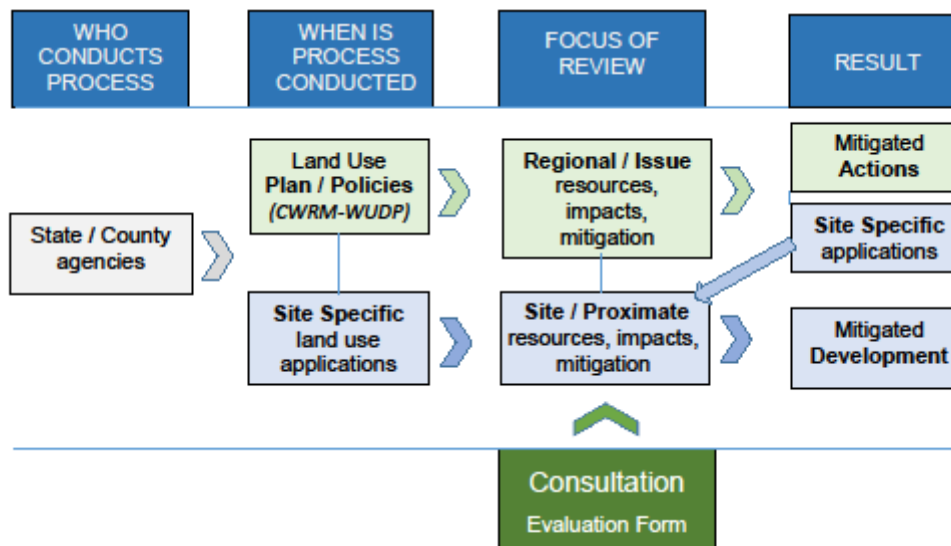
Part II Water Resource Management, Strategies and Recommendations

CONTENT

- 10.** Relation to Management Framework: Ka Pa'akai analysis, water supply sustainability and quality
- 11.** Water Resource Adequacy: Resource availability and uncertainties
- 12.** Strategies: Resource management, conservation, conventional and alternative water sources, land use controls
- 13.** Summary of Recommendations: Planning objective conflicts, recommended tradeoffs, implementation and funding

Part II Ka Pa'akai Analysis

- Supreme Court Ka Pa'akai O Ka 'Aina v. Land Use Commission: Agencies to protect native Hawaiian customary and traditional practices to the extent feasible.
- WUDP proposed uses of water resources accompanied by inquiries into the impacts on traditional and customary rights to ensure that proposed water resource uses are pursued in a culturally appropriate way.
- Matrix (appendix 10) briefly assesses and summarizes how each preliminary strategy may relate to protection of valued resources including traditional and customary native Hawaiian rights, and mitigation measures



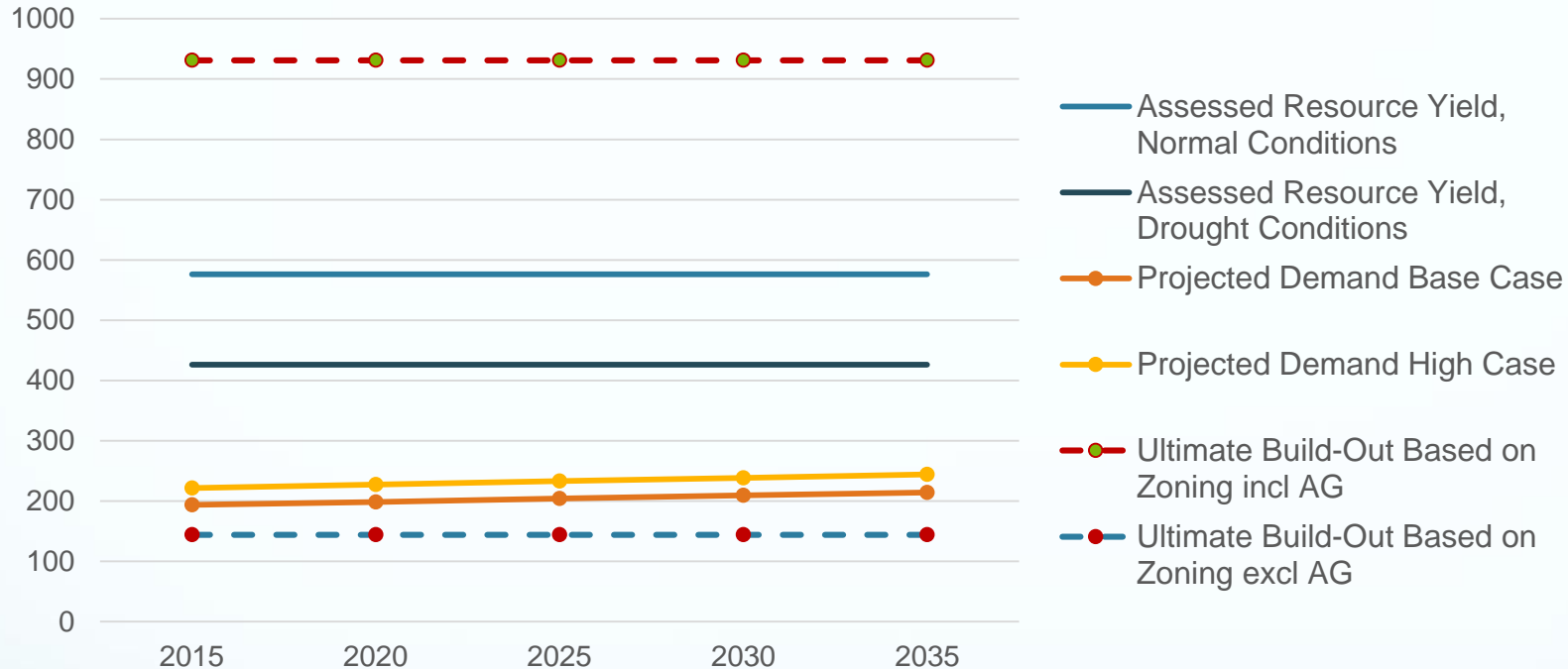
Part II Ka Pa'akai Analysis

Organizations Contacted

- 
- Aha Moku Maui Advisory Committee
 - Department of Hawaiian Homelands (DHHL)
 - Office of Hawaiian Affairs (OHA)
 - Hawaiian Homes Commission
 - State of Hawai'i Office of Historic Preservation
 - County of Maui Planning Department
 - State of Hawai'i Office of Planning
 - State of Hawai'i Commission on Water Resource Management
 - State of Hawai'i Historic Preservation Division
 - Native Hawaiian Legal Corporation
 - Maui Hawaiian Civic Clubs
 - Native Hawaiian Organizations Association
 - Earth Justice
 - Hui o Na Wai `Eha
 - Maui Tomorrow
 - Kamehameha Schools
 - University of Maui Hawaiian Studies Department
 - University of Hawaii at Manoa Hawaiian Studies Department
 - Ka Huli Ao Center for Excellence in Native Hawaiian Law at the University of Hawaii's William S. Richardson School of Law
 - University of Hawaii Environmental Center
 - Ka Piko O Ka Na`auao The Hawaiian Learning Center, Kumu Hula & Cultural Specialist
 - Halau Hula Malani O Kapehe
 - Halau Hula Kauluokala
 - Halau Kekuaokala'au'ala'iliahi
 - Halau Na Lei Kaumaka O Uka
 - Hula Alapa`i I Maluuluolele
 - Halau Ke`alaokamaile

Part II Resource Adequacy

Assessed Resource Yield and Projected Demand (mgd)



Aquifer Sector	Sustainable Yield		Pumpage (2014 Average)	% of Aquifer Pumped
Wailuku	36		20.761	58%
Lahaina	34		6.207	18%
Central	26		62.724	241%
Ko'olau	175		0.916	1%
Hāna	122		0.606	0%
Kahikinui	34		0	0%
Total	427		91.214	21%

Part II Strategies

- 62 **island wide** measures/policies derived from preliminary strategies vetted in the public process:
 - Address issues and concerns
 - Meet planning objectives
 - Reflect the values and guiding principles
 - Feasible considering hydrologic and legal constraints
 - Cost effective to adequately meet projected demand
- Comparative costs over a 20 year life cycle are assessed or estimated in order to compare and roughly characterize resource strategies.
- Regional Plans articulate region specific issues and strategies
- Recommendations include policies and actions that on a county level should provide the foundation and guidance for DWS capital improvement program and budget, public/private partnerships, studies and land use decisions.
- On a state level, recommendations should provide guidance to the CWRM in their decisions regarding pumping permits, stream withdrawals, water reservations and other matters.

Part II Strategies: Resource Management

1. **Continue and increase financial support for watershed management partnerships' fencing and weed eradication efforts**
2. **Promote increased distribution of funding and active reforestation**
3. **Expand watershed protection to incorporate the ahupua`a as a whole and utilize ahupua`a resource management practices.**



- Watershed protection effectively protects and restores the resilience of natural ecosystems and thereby protecting ground and surface water resources.
- Expanded efforts in disturbed watershed areas to address invasive threats before they become established and more difficult and expensive to combat. Watershed restoration through reforestation of a damaged and disturbed landscape has proven successful on a small scale and is strongly supported by community
- Initiate and promote collaboration between agencies and the Native Hawaiian communities can further the practices of ancient knowledge and traditions in resource management. New partnerships to adopt ahupua`a management can be modeled upon the West Maui “Ridge to Reef” Initiative.

Part II Strategies: Resource Management

4. Support increased use of *kalo* lands

5. Enable and assist in providing for Native Hawaiian water rights, cultural and traditional uses through active consultation and participation



- Stream restoration as both an objective and result of establishing numeric Instream Flow Standards, will increase and enhance opportunities for food production and cultural water uses. Grassroots efforts are ongoing and there is interest from Native Hawaiian community to collaborate with state and county agencies.
- Establish instream flow standards that balance in-stream uses, domestic uses, Native Hawaiian and traditional and customary uses with reasonable and beneficial off-stream uses. Active engagement between state and county agencies and the Native Hawaiian community to inform public policy decision makers. The Aha Moku System can serve to provide advice on integration of Native Hawaiian resource management practices with western practices in each moku. Consult with established 'Aha Moku Advisory Committee representative and Moku O Pi'ilani in developing public programs as it relates to regional resource development.

Part II Strategies: Water Quality Management

6. Implement well siting criteria to avoid contaminated groundwater supplies and unnecessary risks to public health

7. Adopt wellhead protection measures for potable wells

8. Educate the farming community in sustainable farming practices to reduce impact from agricultural practices on water resources.

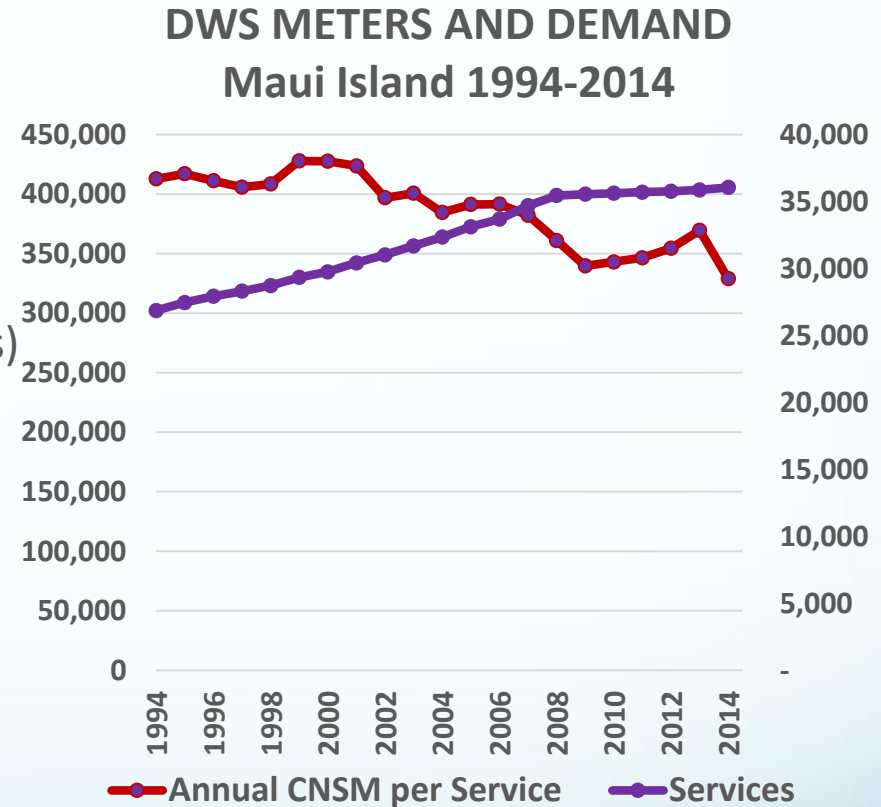
9. Update assessment of potential contaminating activities around drinking water supply and support increased monitoring of potable wells as needed

- Well development in areas with current or historic contaminating activities unnecessarily subjects the public to contaminants, necessitates reliance on costly treatment. Avoid contaminated water supply should be considered to the extent feasible by public water systems.
- Establish protective measures and acceptable land uses within potable well capture zones. Supports objective to maximize water quality, MIP action item “protect water quality for existing and future consumers.”
- Sustainable farming practices : develop a conservation plan to address runoff; waste management to prevent animal wastes to contaminate water supply; fertilizer, pesticides and herbicides management to mitigate over application and to ensure proper storage and disposal. Workshops and education outreach are sponsored by MDWS, Hawai'i Rural Water Association and DOH. Encourage farmers to utilize existing programs and technical assistance
- Source Water Assessment of public water systems on Maui is not been updated to reflect new land use activities or new water sources. Delineate capture zones and assess potential contaminating activities, make information available to public water system customers.

Part II Strategies: Conservation

August 8, 2016 Policy Guidance:

- Rates sufficient to address high uses, outdoor use?
- Restrictive behavioral measures?
- What partnerships would facilitate conservation? (examples R-1 extensions, storm water capture, business pilot projects)
- How to curb non potable use of potable source (climate appropriate crops, dual system, UV sterilize irrigation water)
- DWS role in ag water efficiency?
- Water efficient design (new development)
- Increased resources to support DWS program and/or shift investment to businesses?
- What incentives would you like to see and why?



Part II Strategies: Conservation

Demand side measures Strategies #10 - 25:

- Retrofits/direct installation programs, distribution of water-efficient fixtures and retrofits for existing users and facilities
- Landscaping and irrigation system incentives, targeting dry areas.
- Revise county code to require high efficiency fixtures in all new construction. Develop a comprehensive water conservation ordinance to include xeriscaping regulations

Supply side measures Strategies #26 - 28:

- Annual comprehensive audits
- Fund and implement continuous leak detection program
- Maintain and operate the water system to minimize sources of water loss

Energy programs Strategies #33 - 35:

- Pursue comprehensive energy management
- Increase energy efficiency and improve load management

	2015	2035
Maui Island Population	157,087	206,884
Per Capita Target (-8%) GPD	240	221
Demand Base MGD	37.72	55.27
Demand Target -8% Per Capita	n/a	45.70

- **Agricultural programs Strategies #18, 29 - 32:**
- Irrigation efficiency audits, technical assistance and rebates. Ag technical working groups.
- Augment agricultural water supplies with alternative resources
- Improve irrigation management and efficiency
- Maintain the integrity of plantation irrigation systems including reservoirs

Part II Strategies: Conventional Water Source

36. Support collaborative hydrogeological studies to inform impact from climate change and future well development on groundwater health.
37. Develop groundwater within sustainable yield to provide sufficient supply for growth, maintaining a buffer to account for potential future drought impact and prospective adjustments in aquifers lacking hydrologic studies.
38. Promote the highest quality water for the highest end use
39. Protect and prioritize public trust uses in allocating groundwater in regions of limited resources and conflicting needs.
40. Increase monitoring of groundwater sources to assess water and chloride levels in potable and non-potable wells throughout developed aquifers



Public Trust Uses

- Maintenance of waters in their natural state
- Domestic water use of the general public, particularly drinking water
- The exercise of Native Hawaiian and traditional and customary rights, including appurtenant rights
- Reservations of water for Hawaiian Home Land allotments.

Part II Strategies: Conventional Water Source

Groundwater Development

41. Promote well siting and distribution strategies for all public water systems to ensure optimal spacing and withdrawals for aquifer health and equitable use

“Smart” source development ensures:

- **Optimized distribution of withdrawals based on hydrologic models and studies**
- **Potable water quality that is protected from existing and future contamination sources**
- **Wells that serve development in compliance with the Maui Island Plan growth strategies**
- **Regional resource preservation to meet future demand for public trust uses**

42. Formalize demand response plans for water purveyors that address water shortage and aquifer changes.

43. Develop a water availability rule to provide certainty in land use planning and ensure that reliable source and infrastructure capacity is provided within reasonable time for planned growth

Part II Strategies: Conventional Water Source

Groundwater Development



- 44. Increase system flexibility so that regional sources can be moved to support areas of need, both within the municipal systems and between regional public water systems
- 45. Ensure that public/private groundwater development agreements reflect the public trust needs and are in keeping with the water allocation priorities of the MIP
- 46. Develop groundwater to maximize reliability of potable supply and as contingency in areas currently dependent on surface water
- 47. Diversify supply for agricultural use to increase reliability

Part II Strategies: Conventional Water Source



- 48. Encourage CWRM to prioritize establishing IFS for diverted streams with potential conflicting uses.
- 49. In the absence of established IFS, consider drought conditions as baseline to determine available stream flow for instream and off stream needs.
- 50. Defer any new surface water diversions to meet new projected demand.
- 51. Balance existing diversions with alternative sources for agriculture to mitigate low flow stream conditions
- 52. Maximize efficiencies in surface water transmission, distribution and storage.
- 53. Add raw water storage to increase reliable supply once instream flow standards are established
- 54. Increase treatment plan capacity at water treatment plant facilities to accommodate additional treatment in wet season.
- 55. Support plans and programs to develop additional sources of water for irrigation purposes.
- 56. Prioritize delivery and use of agricultural water within County agricultural parks to cultivation of food crops for local consumption.

Part II: Strategies: Alternative Water Sources

57: Expand requirement for new development to connect to recycled water infrastructure if practical

58. Promote closer collaboration between MDWS and MDEM to master plan and utilize DWSRF funding to maximize recycled water use.

59. Explore expansion of “scalping plants” (small-scale membrane filter systems that put effluent closer to reuse locations) in designated growth areas.

60. Inform and educate the residential and commercial community of easy, affordable rainfall catchment for recharge and garden use

61. Provide incentives for residential rainwater catchment systems.

62. Explore and promote opportunities for large volume stormwater runoff for agricultural irrigation.

Part II: Implementation and Funding

Implementation Process

- Implementing actions to effectuate the intent of the policies and strategies should be developed over the twenty-year planning period.
- Identifies agencies and organizations tasked with scoping and refining strategies into projects
- Estimated timeframes for implementation allow for flexibility to re-scope, prioritize and adjust to available funding.

Funding

- Primarily shared between state and county agencies, with the greatest burden on MDWS
- Major MDWS capital improvements for conventional resource strategies assessed in the MIP to meet projected demand to year 2030 have not changed significantly

What's next:

REGIONAL PLANS:

Lahaina

Kahikinui

Hana

Ko`olau

Wailuku

Central

<http://co.maui.hi.us/2051/Maui-Island-Water-Use-Development-Plan>

Mahalo!